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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,272	11/16/2001	Mark H. Sher	020882-000210	3035
26541	7590	12/05/2003	EXAMINER	
RITTER, LANG & KAPLAN 12930 SARATOGA AE. SUITE D1 SARATOGA, CA 95070			LEE, JOHN D	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 12/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary****Application No.**

09/991,272

**Applicant(s)**

SHER ET AL.

**Examiner**

John D. Lee

**Art Unit**

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 3.1, 4-10, 13-45 is/are rejected.
- 7) ☒ Claim(s) 2, 11, 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e) based on provisional U.S. Application 60/249,496, filed November 16, 2000.

The Declaration filed on March 28, 2002, is objected to because of the following minor informality: the title stated therein does not match the title of the invention given elsewhere throughout the application (the word “**SIGNAL**” does not appear in the title listed in the Declaration). This minor informality is hereby waived, however, and no additional Declaration is required.

The five (5) sheets of drawing filed on June 11, 2002, are acceptable.

The disclosure is objected to because of the following minor informality: on page 3, in the “**BRIEF DESCRIPTION OF THE DRAWINGS**”, the reference to “Fig. 8B” is incorrectly set forth as “Fig. 8A” (page 3, line 14). Correction is required. Applicant's cooperation is requested in correcting any other errors of which applicant may become aware in the specification.

This application has been filed with improperly numbered claims. The submitted claims are numbered: 1, 2, 3, 3.1, 4-25, and 27-46. A claim cannot be given a non-whole number such as “3.1”, and claim numbers cannot be skipped (as claim 26 has been). See 37 C.F.R. § 1.126. For examination purposes (this action only), the claims will be identified as follows: 1, 2, 3, 3.1, and 4-45 (claims 27-46 having been renumbered as 26-45). In response to this Office action, applicant should submit a clean set of claims wherein the above-identified new numbers are employed (with appropriate notation showing the changes). In this clean set of claims, the claim identified as “3.1” should be cancelled and resubmitted as the next highest numbered claim (i.e. claim 46).

Claims 9, 11, and 44 are objected to because of the following minor informalities. Claim 9 ends in two periods; only one is necessary. In claim 11, line 2, the word "signal" (singular) should actually be "signals" (plural). In claim 44 (applicant's next-to-last claim) the following corrections should be made: in line 1, the word "a" should be inserted before "first"; and in the last line, the first occurrence of the word "said" should be deleted.

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 3.1, 6-10, and 13-45 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 3 and 3.1, there is no antecedent support for the term "said one-half of said pump frequency", thus rendering the claims indefinite. It is believed that these claims should depend from claim 2 rather than from claim 1. In claim 6, there is no antecedent support for the term "said multiple state separator", thus rendering the claim indefinite. Claims 7-10, being dependent upon claim 6, inherently contain the same indefiniteness. In line 11 of claim 13, there is no antecedent support for the term "said first separator" because of the adjective "first". Claim 13 (along with all claims dependent thereon) is thus indefinite. In line 18 of claim 19, the term "said second separator" is inaccurate since a plurality of second separators was previously defined. The term should actually read "each second separator". In the next-to-last line of claim 19, there is no antecedent support for the term "said at least one output ports of said difference frequency generators" because the difference frequency generators were not previously defined as specifically having output ports. For these reasons claim 19 (along with all claims dependent thereon) is indefinite. In claim 22, line 3,

“said separator” should actually be “said first separator”. In the next-to-last line of claim 25, there is no antecedent support for the term “said pump frequency”. Claim 25 (along with all claims dependent thereon) is therefore indefinite. Claim 26 (presented as claim 27) depends upon a non-existent claim and is thus indefinite. Claim 27 (presented as claim 28) ends in a comma, implying that additional claim language has been omitted. The claim is thus indefinite. In the tenth line of claim 44 (presented as claim 45), there is no antecedent support for the term “said pump frequency”. Claim 44 (along with claim 45 which is dependent thereon) is therefore indefinite.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 5, 25, 27, 28, and 30-33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,141,138 to Machida et al. Machida et al discloses a measuring device which includes an optical signal converter for converting light of one frequency to light of another frequency, the optical signal converter comprising a difference frequency generator which receives fundamental waves from two light sources (i.e. an input signal and a pumping signal) and generates a converted lightwave at a frequency that is the difference between the frequencies of the fundamental waves from the two light sources. The Machida et al optical signal converter also comprises an optical separator which separates the converted lightwave from the fundamental waves from the two light sources. Machida et al does not disclose that the difference between the frequency of the converted lightwave and the frequency of one of the

fundamental waves is an odd multiple of the separation between desired output frequencies (i.e. harmonics). If, however, one considers the “odd multiple” to be one (encompassed by the meaning of “odd multiple”), then the difference between the frequency of the converted lightwave and the frequency of one of the fundamental waves is required to be the same as the frequency separation between the generated harmonics of the converted radiation. This would be true in Machida et al. The claimed optical signal converter, then, in its broadest possible interpretation, would have been entirely obvious in view of the disclosure of Machida et al. With respect to applicant’s claims 4, 30, and 33, it is noted that the Machida et al separators are typically spectral prisms, dichroic mirrors, or the like (column 10, lines 37-40). Since the function of these separators is to separate the harmonic components (converted lightwaves) from the fundamental wave components, however, the use of other known elements for accomplishing same would have been obvious. The use of a WDM interleaver device (which separates wavelengths) as the Machida et al separator would thus have been obvious to a person of ordinary skill in the art.

Claims 2, 11, and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose or reasonably suggest an optical signal converter of the type claimed, further wherein one-half of the pumping frequency is between two frequencies of the preselected separated output frequencies in a frequency grid. The prior art also does not disclose or reasonably suggest an optical signal converter of the type claimed, further including the “multiple frequency” limitations of claims 11 and 12 herein.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited U.S. Patent to Bhat et al describes an optical difference-frequency generator wherein the converted output frequency is designed to be one-half the pumping frequency. The cited U.S. Patent to Risk et al discusses an acousto-optic fiber-optic frequency shifter involving either a sum-frequency or difference-frequency operation between the acoustic and optical waves, and further involving an odd multiple relationship between the acoustic frequency and beat frequencies of optical waves. Other somewhat related difference-frequency generation techniques and devices can be seen in the cited U.S. Patents to Youngquist et al, Kincaid et al, and Kim et al.

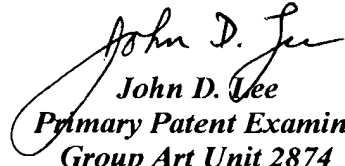
This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the Examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. §§ 102(e), (f) or (g) prior art under 35 U.S.C. § 103(a).

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (703) 308-4886. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (703) 308-0956, to the technical support staff supervisor (Team

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2) at telephone number (703) 308-3072, or to the Technology Center 2800 Customer Service Office at telephone number (703) 306-3329.

  
**John D. Lee**  
**Primary Patent Examiner**  
**Group Art Unit 2874**